Amendments to the Claims

1. *(Currently Amended)* A method of operating a DC/DC up-down converter which has

- an input voltage ~~(U_{in})~~ and at least a first and a second output voltage ~~(U_A, U_B)~~,
- at least one inductive energy storage means ~~(L_1)~~, which is connected with a first terminal ~~(X_1)~~ to a main switching means ~~(T_1)~~ and can be connected with a second terminal ~~(Y_1)~~ to at least two outputs ~~(A B)~~ via switching means ~~(T_3, D_3)~~,
- output switching means ~~(T_3, D_3)~~ for providing electrical energy for the first and second output voltages ~~(U_A, U_B)~~ by supplying a coil current ~~(I_{L1})~~,
- a main switching means ~~(T_1)~~ between the inductive energy storage means ~~(L_1)~~ and a DC voltage source generating the input voltage ~~(U_{in})~~,
- a free-wheeling switching means ~~(T_2 D_2)~~ which makes possible the continuation of the current flow in the inductive means ~~(L_1)~~ if the main switching means ~~(T_1)~~ is switched off and
- a control means (controller) for selective actuation of all switching means ~~(T_1, T_2, T_3, T_4)~~,

wherein

- the first output voltage ~~(U_A)~~, which is lower than the input voltage ~~(U_{in})~~, is present on the first output ~~(A)~~ and
- the second output voltage ~~(U_B)~~, which is higher than the input voltage ~~(U_{in})~~, is present on the second output ~~(B)~~
- at least a further switching means ~~(T_3)~~ for controlling the direction of the coil current ~~(I_{L1})~~ into the first output ~~(A)~~ or into the second output ~~(B)~~ is connected in series with the first output ~~(A)~~,

characterized in that the control means (controller)

-- controls the output switching means ~~(T_3, T_4)~~, so that in the course of one switching cycle ~~(SZ_1, SZ_2)~~ the coil current ~~(I_{L1})~~ flows from the second terminal ~~(Y_1)~~ into both output branches ~~(A, B)~~ and

-- controls the main switch ~~(T_1)~~ in the transient state of the up-down converter, so that the average voltage on the first terminal ~~(X_1)~~ is equal to the voltage on the second terminal ~~(Y_1)~~.

2. *(Currently Amended)* A method as claimed in claim 1 in which the control means (controller) generates switching phases ~~(Φ_2, Φ_3 and Φ_5, Φ_6, respectively)~~ for the switching means ~~(T_1, T_2, T_3, T_4)~~ and the course of the coil current ~~(I_{L1})~~ comprises an up-conversion phase and a down-conversion phase, characterized in that the down-conversion phase of the coil current ~~(I_{L1})~~ comprises at least two switching phases ~~(Φ_2, Φ_3 and Φ_5, Φ_6, respectively)~~.

3. *(Currently Amended)* A method as claimed in claim 2, characterized in that the switching cycle ~~(SZ1, SZ2)~~ has all the switching phases ~~(Φ_1, Φ_2, Φ_3 and Φ_4, Φ_5, Φ_6, respectively),~~ exactly once.

4. *(Currently Amended)* A method of operating a DC/DC up-down converter which has

- an input voltage ~~(U_{in})~~ and at least a first and a second output voltage ~~(U_D, U_E),~~
- at least one inductive energy storage means ~~(L_2),~~ which is connected with a first terminal ~~(X_2)~~ to a DC voltage source generating in the input voltage ~~(U_{in})~~ and can be connected with a second terminal ~~(Y_2)~~ to the outputs ~~(D, E)~~ via the switching means ~~(T_6, D_4),~~
- output switching means ~~T_6, D_4)~~ for providing electrical energy for the first and the second output voltage ~~(U_D, U_E)~~ by supplying a coil current ~~(I_{L2}),~~
- a main switching means ~~(T_5)~~ between a second terminal ~~(Y_2)~~ of the inductive energy storage means ~~(L_2)~~ and the other pole of the DC voltage source, and

-a control means (controller) for selectively actuating all switching means ~~(T_5, T_6, T_7),~~

- wherein

- the first output voltage ~~(U_D),~~ which is lower than the input voltage ~~(U_{in}),~~ is present on the first output ~~(D)~~ and

- the second output voltage ~~(U_E),~~ which exceeds the input voltage ~~(U_{in}),~~ is present on the second output ~~(E),~~
- at least a further switching means ~~(T_6)~~ for controlling the direction of the coil current ~~(I_{L2})~~ into the first output ~~(D)~~ or into the second output ~~(E)~~ is connected in series with the first output ~~(D),~~

characterized in that the control means ~~(controller)~~

-- controls the output switching means ~~(T_6, T_7),~~ so that in the course of one switching cycle ~~(SZ_3, SZ_4)~~ the coil current ~~(I_{L2})~~ flows from the second terminal ~~(Y_2)~~ into both output branches ~~(D, E, F)~~ at least once and and

-- controls the main switch ~~(T_5)~~ in the transient state of the up-down converter so that the average voltage on the second terminal ~~(Y_2)~~ of the cloil ~~(L_2)~~ is equal to the voltage on the first terminal ~~(X_1),~~ thus equal to the input voltage ~~(U_{in}).~~

5. *(Currently Amended)* A method as claimed in claim 4, wherein the control means ~~(controller)~~ generates switching phases ~~(Φ_7, Φ_8, Φ_9 and Φ_{10}, Φ_{11}, Φ_{12}, Φ_{13} respectively)~~ for each switching means ~~(T_5, T_6, T_7)~~ and the pattern of the coil current ~~(I_{L2})~~ has an up-conversion phase and a down-conversion phase, characterized in that the up-conversion phase of the coil current ~~(I_{L2})~~ comprises at least two switching phases ~~(Φ_7, Φ_8 and Φ_{10}, Φ_{11} respectively).~~

6. *(Currently Amended)* A method as claimed in claim 5, characterized in that the switching cycle ~~(SZ_3, SZ_4)~~ comprises all switching phases ~~(Φ_7, Φ_8, Φ_9 and Φ_{10}, Φ_{11}, Φ_{12}, Φ_{13}, respectively)~~, exactly once.

7. *(Currently Amended)* A method as claimed ~~on one of the preceding claims~~in claim 1, characterized in that the switching means ~~(T_1, T_2, …, T_7)~~ are MOSFETs; IGBTs, GTOs or bipolar transistors.

8. *(Currently Amended)* Implementation of a method as defined in ~~the Claims 1 to 9~~claim 1, for the operation of a DC/DC up-down converter in electronic appliances in which consumers are to be supplied with different voltages such as, for example, in mobile telephones, PDAs ~~(Personal Digital Assistants)~~ or MP3 players.